



Serial Media Converters

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Serial Media Converters



Chassis Media Converters



	TRC-190-AC TRC-190-DC	TCF-142-M-SC-RM TCF-142-M-ST-RM	TCF-142-S-SC-RM TCF-142-S-ST-RM
Optical Fiber Side			
Fiber Connector	–	SC or ST	
Cables Requirements	–	50/125, 62.5/125, or 100/140 μm	8.3/125, 8.7/125, 9/125, or 10/125 μm
Transmission Distance	–	5 km	40 km
Wavelength	–	850 nm	1310 nm
Tx Output	–	> -5 dBm	
Rx Sensitivity	–	-20 dBm	-25 dBm
Point-to-Point Transmission	–	Point-to-Point Transmission: Half-duplex or full-duplex	
RS-232/422/485 Side			
Connector	–	DB9	
RS-232 Signals	–	TxD, RxD, GND	
RS-422 Signals	–	TxD+, TxD-, RxD+, RxD-, GND	
RS-485-4w Signals	–	TxD+, TxD-, RxD+, RxD-, GND	
RS-485-2w Signals	–	Data+, Data-, GND	
Baudrate	–	50 bps to 921.6 Kbps	
ESD Protection	–	15 KV	
Physical Characteristics			
Housing	SECC (1.2 mm)	–	
Dimensions (mm)	440 x 260 x 77 mm	86.8 x 136.5 x 21 mm	
Weight	5.2 kg (11.4 lbs), with one power module installed	–	
Number of Slots	19 slots in the front for slide-in modules, 2 slots in the back for power supply modules	–	
Environmental Limits			
Operating Temperature	0 to 60°C		
Operating Humidity	5 to 95% RH		
Storage Temperature	-20 to 75°C		
Power Requirements			
Input Voltage	100 to 240 VAC or 36 to 72 VDC	12 VDC	
Power Consumption	3.2 A @ 36 VDC (max. output)	150 mA @ 12 V	
Standards and Certifications			
Safety	UL 60950-1, EN 60950-1		
EMC	CE, FCC		
EMI	EN 55022 Class A, FCC Part 15 Subpart B Class A		
EMS	EN 61000-4-2 (ESD) Level 3, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 2, EN 61000-4-5 (Surge) Level 2, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (PFMF) Level 3, EN 61000-4-11 (DIPS)		
Freefall	–	IEC 60068-2-32	
Green Product	RoHS, CRoHS, WEEE		
Reliability			
Warranty	5 years (see www.moxa.com/warranty)		

Serial-to-Fiber Media Converters



	ICF-1150-M-SC/ST ICF-1150-M-SC/ST-T	ICF-1150I-M-SC/ST ICF-1150I-M-SC/ST-T	ICF-1150-S-SC/ST ICF-1150-S-SC/ST-T	ICF-1150I-S-SC/ST ICF-1150I-S-SC/ST-T	TCF-142-M-SC/ST TCF-142-M-SC/ST-T	TCF-142-S-SC/ST TCF-142-S-SC/ST-T	TCF-90-M/S
Optical Fiber Side							
Fiber Connector	SC or ST						ST
Cables Requirements	Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm Multi-mode: 50/125, 62.5/125, or 100/140 μm						
Transmission Distance	Single-mode: 40 km Multi-mode: 5 km						
Wavelength	Single-mode: 1310 nm Multi-mode: 850 nm						
Tx Output	Single-mode: > -5 dBm Multi-mode: > -5 dBm						
Rx Sensitivity	Single-mode: -25 dBm Multi-mode: -20 dBm						
Point-to-Point Transmission	Half-duplex or full-duplex						–
Multi-drop Transmission	Half-duplex, fiber ring						–
RS-232 Side							
Connector	DB9 female			Terminal block			DB9 female
Signals	Tx, Rx, GND						TxD, RxD, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)
Baudrate	50 bps to 921.6 Kbps						300 bps to 115.2 Kbps
RS-232/422/485 Side							
Connector	Terminal Block						–
RS-232 Signals	TxD, RxD, GND						
RS-422 Signals	TxD+, TxD-, RxD+, RxD-, GND						–
RS-485-4w Signals	TxD+, TxD-, RxD+, RxD-, GND						–
RS-485-2w Signals	Data+, Data-, GND						–
Baudrate	50 bps to 921.6 Kbps						–
ESD Protection	15 KV for all signals						–
Isolation	–	2 KV	–	2 KV	–	–	–
Physical Characteristics							
Housing	Metal						ABS + PC
Dimensions (mm)	30.3 x 70 x 115 mm			67 x 100 x 22 mm			42 x 80 x 22 mm
Environmental Limits							
Operating Temperature	0 to 60°C or -40 to 85°C (for T models)						0 to 60°C
Operating Humidity	5 to 95% RH						5 to 95% RH
Storage Temperature	-40 to 85°C						-20 to 75°C
Power Requirements							
Source of Input Power	–	–	–	–	–	–	RS-232 port (TxD, RTS, DTR) or power input jack
Input Voltage	12 to 48 VDC						
Power Consumption	127 mA @ 12 V	163 mA @ 12 V	127 mA @ 12 V	163 mA @ 12 V	140 mA @ 12 V		20 mA @ 5 V
Voltage Reversal Protection	Protects against V+/V- reversal						–
Over Current Protection	1.1 A				1.1 A		–
Standards and Certifications							
Safety	UL 508				UL 60950-1		UL 60950-1
Hazardous Location	Hazardous Location: UL/cUL Class I Division 2 Groups A/B/C/D, ATEX Zone 2 EEx nC IIC				–		–
EMC	CE, FCC						
EMI	EN 55022 Class B, FCC Part 15 Subpart B Class B						FCC Part 15 Subpart B Class B
EMS	EN 61000-4-2 (ESD) Level 4, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 4, EN 61000-4-5 (Surge) Level 3, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (PFMF) Level 3				EN 61000-4-2 (ESD) Level 3, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 2, EN 61000-4-5 (Surge) Level 2, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (SFMF) Level 1		IEC 61000-4-2 (ESD) Level 2, IEC 61000-4-3 (RS) Level 2, IEC 61000-4-4 (EFT) Level 2, IEC 61000-4-5 (Surge) Level 3, IEC 61000-4-6 (CS) Level 2, IEC 61000-4-8 (SFMF) Level 1
Freefall	IEC 60068-2-32				–		–
Green Product	RoHS, CRoHS, WEEE				RoHS, CRoHS, WEEE		RoHS, CRoHS, WEEE
Reliability							
Warranty	5 years (see www.moxa.com/warranty)						

Serial Converters and Repeaters



	TCC-100 TCC-100-T	TCC-100I TCC-100I-T	TCC-80	TCC-80I	TCC-120	TCC-120I	TCC-82
RS-232 Side							
Connector	DB9 female		DB9 female		–	–	DB9 male/female
Signals	TxD, RxD, RTS, CTS, GND (Loop-back wiring: DTR to DSR and DCD)		TxD, RxD, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)		–	–	TxD, RxD, RTS, CTS, GND (Loop-back wiring: DTR to DSR and DCD)
RS-422/485 Side							
Connector	Terminal Block		Terminal Block or DB9 male		Terminal block on both ends		–
Signals	(interface selected by DIP switch) RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w: Data+, Data-, GND		(interface selected by DIP switch) RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w: Data+, Data-, GND		(interface selected by DIP switch) RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w: Data+, Data-, GND		–
RS-485 Data Direction Control	ADDC®		ADDC®		ADDC®		–
Serial Communication							
Baudrate	50 bps to 921.6 Kbps		50 bps to 115.2 Kbps		50 bps to 921.6 Kbps		50 bps to 115.2 Kbps
Pull High Resistance	1K/150K ohm		1K ohm	4.7K ohm	1K/150K ohm		–
Pull Low Resistance	–		–	–	–		–
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	2 KV	–	2.5 KV	–	2 KV	4 KV
Physical Characteristics							
Housing	Metal		ABS + PC		Metal		ABS
Dimensions (mm)	67 x 100.4 x 22 mm		42 x 80 x 22 mm		67 x 100.4 x 22 mm		42 x 80 x 23.6 mm
Weight	148 ± 5 g		50 ± 5 g		148 ± 5 g		60 ± 5 g
Environmental Limits							
Operating Temperature	-20 to 60°C, or -40 to 85°C		0 to 60°C		-20 to 60°C		0 to 60°C
Operating Humidity	5 to 95% RH		5 to 95% RH		5 to 95% RH		5 to 95% RH
Storage Temperature	-40 to 85°C		-20 to 75°C		-20 to 75°C		-20 to 75°C
Power Requirements							
Source of Input Power	Power input jack		RS-232 port (TxD, RTS, DTR) or power input jack		Power input jack		RS-232 port (TxD, RTS, DTR) or power input jack
Input Voltage	12 to 48 VDC		5 to 12 VDC		12 to 48 VDC		5 to 12 VDC
Power Consumption	85 mA @ 12 V	150 mA @ 12 V	10 mA @ 5 V	20 mA @ 5 V	65 mA @ 12 V	180 mA @ 12 V	20 mA @ 5 V
Voltage Reversal Protection	Protects against V+/V- reversal		–	–	Protects against V+/V- reversal		–
Over Current Protection	✓	✓	–	–	✓	✓	–
Standards and Certifications							
Safety	UL 60950-1						
EMC	CE, FCC						
EMI	FCC Part 15 Subpart B Class B						
EMS	IEC 61000-4-2 (ESD) Level 2, IEC 61000-4-3 (RS) Level 2, IEC 61000-4-4 (EFT) Level 2, IEC 61000-4-5 (Surge) Level 2, IEC 61000-4-6 (CS) Level 2, IEC 61000-4-8 (SFMF) Level 1		EN 61000-4-2 (ESD) Level 2, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 2, EN 61000-4-5 (Surge) Level 3, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (RFMF) Level 1				
Green Product	RoHS, CRoHS, WEEE						
Reliability							
Warranty	5 years (see www.moxa.com/warranty)						

CAN-to-Fiber, PROFIBUS-to-Fiber Converters



		ICF-1170I-M-ST ICF-1170I-M-ST-T	ICF-1180I-M-ST/ST-T ICF-1180I-S-ST/ST-T
Optical Fiber Side			
Fiber Connector		ST	
Cables Requirements		Multi-mode: 50/125, 62.5/125, or 100/140 μm	
Transmission Distance		Up to 2 km	Multi-mode: 4km Single-mode: 45km
Wavelength		Multi-mode: 850 nm	Multi-mode: 850 nm Single-mode: 1310 nm
Tx Output		Multi-mode: > -5 dBm	Multi-mode: > -12 dBm Single-mode: > -8 dBm
Rx Sensitivity		Multi-mode: -20 dBm	Multi-mode: -29 dBm Single-mode: -29 dBm
Fieldbus Interface			
Connector		3-pin removable screw terminal	DB9 female
Specification		CAN 2.0 A and 2.0B (ISO 11898-2)	PROFIBUS DP (IEC 61158-2)
Signal Support		CAN_H, CAN_L, CAN_GND	PROFIBUS D+, PROFIBUS D-, RTS, Signal common, 5V
Optical Isolation		2 KV	
Transfer rate		Up to 1 Mbps	Up to 12Mbps
Termination Resistors		120 ohms (selected by DIP switch)	
Physical Characteristics			
Housing		Metal	
Dimensions (mm)		30.3 x 70 x 115 mm (11.9 x 27.6 x 45.3 in)	
Environmental Limits			
Operating Temperature	Standard Temperature	0 to 60°C	
	Wide Temperature	-40 to 85°C	-40 to 75°C
Operating Humidity		5 to 95% RH	
Storage Temperature		-40 to 85°C	
Power Requirements			
Input Voltage		12 to 48 VDC dual power inputs for redundant power	
Power Consumption		221 mA @ 12 V	-
Voltage Reversal Protection		Protects against V+/V- reversal	
Over Current Protection		1.1 A (protects against two signals shorted together)	
Standards and Certifications			
Safety		UL 508, EN 60950-1	UL 60950-1, EN 60950-1
EMC		CE, FCC	
EMI		EN 55022 Class A, FCC Part 15 Subpart B Class A	EN 55022 Class A, FCC Part 15 Subpart B Class A
EMS		EN 61000-4-2 (ESD) Level 4, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 4, EN 61000-4-5 (Surge) Level 3, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (PFMF) Level 3	-
Freefall		IEC 60068-2-32	-
Green Product		RoHS, CRoHS, WEEE	-
Reliability			
Warranty		5 years (see www.moxa.com/warranty)	

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Serial Media Converters > Product Selection Guide

TRC-190 Series

Rackmount chassis for the NRack System™



- > 19-inch chassis for rack-mount use
- > 19 slots for high density applications
- > Supports hot-swap and dual power input with redundancy
- > Fanless chassis design reduces servicing costs



: Introduction

The TRC-190 series provides 19 slots for media converter modules from the CSM-200 series of Ethernet-to-fiber modules and the TCF-142-RM series of serial-to-fiber modules. A TRC-190 chassis comes

with one AC or DC power input, with an optional redundant power expansion module available for greater reliability. The TRC-190 series' power input module supports the hot-swap feature.

: Specifications

Physical Characteristics

Housing: SECC (1.2 mm)

Dimensions: 440 x 260 x 77 mm (18.6 x 11 x 3.3 in)

Weight: 5.2 kg (11.4 lbs), with one power module installed

Number of Slots: 19 slots in the front for slide-in modules, 2 slots in the back for power supply modules

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: Universal 100 to 240 VAC (47 to 63 Hz) or 36 to 72 VDC

Power Consumption:

Max. Output: 3.2A @ 36VDC

Standards and Certifications

Safety: UL 60950-1, EN 60950-1

EMC: CE, FCC

EMI: EN 55022 Class A, FCC Part 15 Subpart B Class A

EMS:

EN 61000-4-2 (ESD) Level 3,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 2,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (PFMF) Level 3,

EN 61000-4-11 (DIPS)

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 1,055,112 hrs

Database: Telcordia (Bellcore), GB

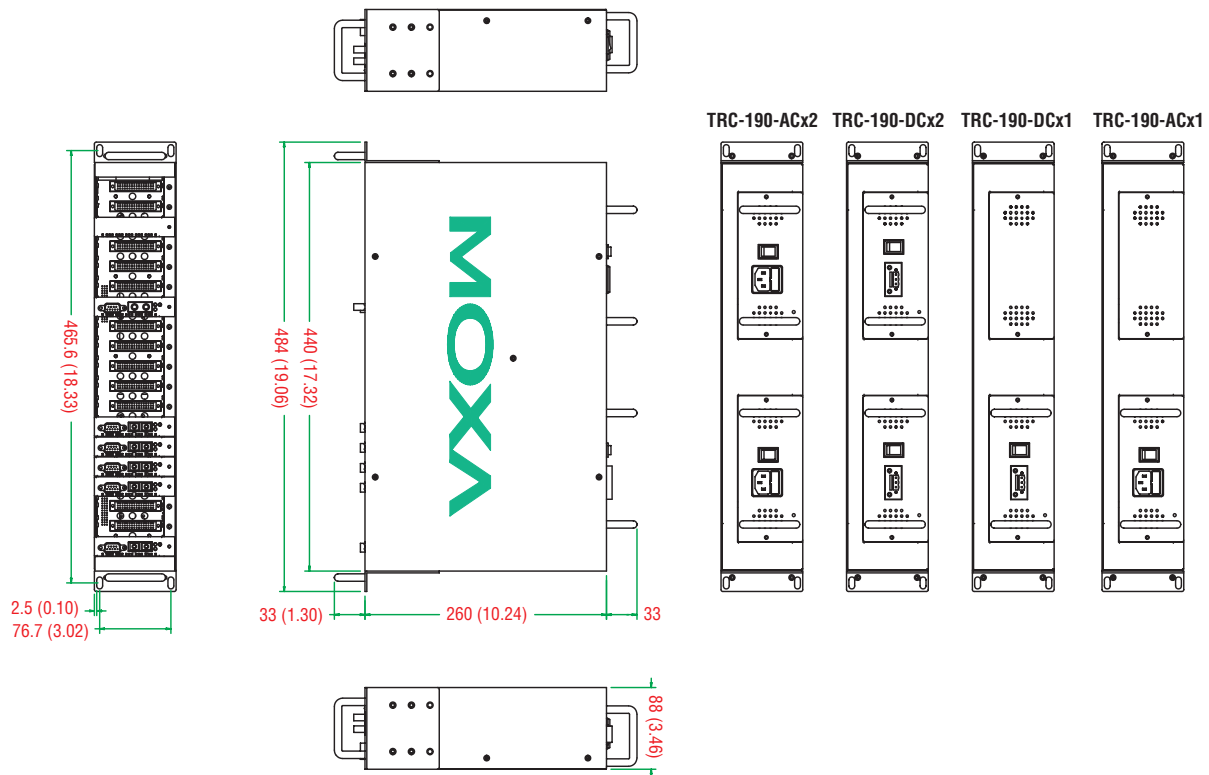
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



Ordering Information

Available Models

TRC-190-AC: Rack chassis, 2U, single 110 to 240 VAC input, with 19 slots on front panel

TRC-190-DC-48: Rack chassis, 2U, single 36 to 72 VDC input, with 19 slots on front panel

Available Slide-in Modules

CSM-200-1213: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode ST connector

CSM-200-1214: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode SC connector

CSM-200-1218: 10/100BaseT(X) to 100BaseFX slide-in module media converter, single-mode SC connector

TCF-142-M-SC-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, SC connector

TCF-142-M-ST-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, ST connector

TCF-142-S-SC-RM: RS-232/422/485 to single-mode fiber slide-in module converter, SC connector

TCF-142-S-ST-RM: RS-232/422/485 to single-mode fiber slide-in module converter, ST connector

Optional Accessories (can be purchased separately)

PWR-190-AC: Redundant power supply, 110 to 240 VAC

PWR-190-DC-48: Redundant power supply, 36 to 72 VDC

Plate-1: Face plate to cover unused front panel slots (required for all unused slots)

Package Checklist

- 1 TRC-190 with single power input
- Power cord (for TRC-190-AC only)
- 18 face plates
- User's manual (printed)
- Warranty card

TCF-142-RM Series

RS-232/422/485 to fiber slide-in modules for the NRack System™



- > Extend RS-232/422/485 transmission up to:
 - 40 km with single-mode
 - 5 km with multi-mode
- > 1K or 150K ohm adjustable pull high/low resistor
- > "Ring" and "Point-to-Point" transmission supported



Introduction

The TCF-142-RM series of serial-to-fiber converters are slide-in modules that work with the TRC-190 chassis. The modules convert

from the RS-232, RS-422, or RS-485 signal to a fiber optic signal.

Automatic Baudrate Detection

The TCF-142-RM series can automatically detect the serial baudrate. This is an extremely convenient feature. Even if a device's baudrate

is changed, the signal will still be transmitted through the media converter without any problem.

Specifications

Optical Fiber Side

Fiber Connector: SC or ST

Cable Requirements:

Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μ m

Multi-mode: 50/125, 62.5/125, or 100/140 μ m

Transmission Distance:

Single-mode: 40 km

Multi-mode: 5 km

Wavelength:

Single-mode: 1310 nm

Multi-mode: 850 nm

Tx Output:

Single-mode: > -5 dBm

Multi-mode: > -5 dBm

Rx Sensitivity:

Single-mode: -25 dBm

Multi-mode: -20 dBm

Point-to-Point Transmission: Half-duplex or full-duplex

Ring Transmission: Half-duplex

RS-232/422/485 Side

Connector: DB9

RS-232 Signals: TxD, RxD, GND

RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-2w Signals: Data+, Data-, GND

Baudrate: 50 bps to 921.6 Kbps

ESD Protection: 15 KV for all signals

Physical Characteristics

Dimensions: 86.8 x 136.5 x 21 mm (3.42 x 5.37 x 0.83 in)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: 12 VDC

Power Consumption: 150 mA @ 12 V

Standards and Certifications

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class A

EMS:

EN 61000-4-2 (ESD) Level 3,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 2,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (PFMF) Level 3

Freefall: IEC 60068-2-32

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 514,926 hrs

Database: Telcordia (Bellcore), GB

Warranty

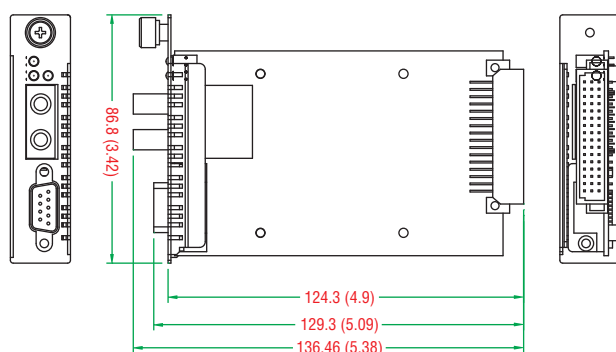
Warranty Period: 5 years

Details: See www.moxa.com/warranty

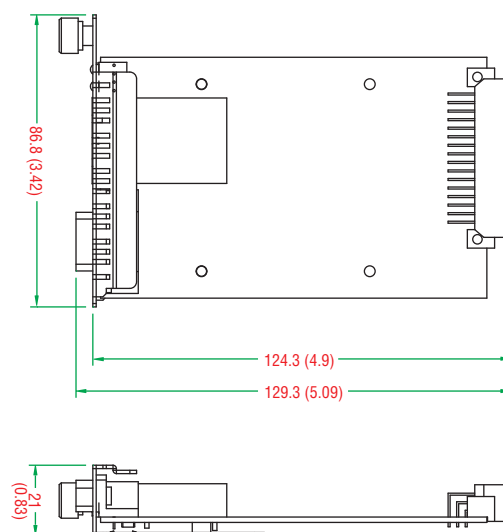
Dimensions

Unit: mm (inch)

TCF-142-M/S-ST-RM Series

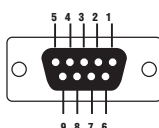


TCF-142-M/S-SC-RM Series



Pin Assignment

DB9 female connector



Pin	RS-232	RS-422/485-4w	RS-485-2w
1	–	RxD-(A)	Data-(A)
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	–	TxD-(A)	–
5	GND	GND	GND
6	–	–	–
7	–	–	–
8	–	–	–
9	–	–	–

: Ordering Information

Available Models

TCF-142-M-SC-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, SC connector

TCF-142-M-ST-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, ST connector

TCF-142-S-SC-RM: RS-232/422/485 to single-mode fiber slide-in module converter, SC connector

TCF-142-S-ST-RM: RS-232/422/485 to single-mode fiber slide-in module converter, ST connector

Package Checklist

- 1 TCF-142-RM fiber converter
- Quick installation guide (printed)
- Warranty card

ICF-1150 Series

Industrial serial-to-fiber converters



- > 3-way communication: RS-232, fiber, and RS-422/485
- > Rotary switch to change the pull high/low resistor value
- > Extend RS-232/422/485 transmission up to:
 - 40 km with single-mode
 - 5 km with multi-mode
- > 3-way Galvanic Isolation (for "I" model only)
- > -40 to 85°C wide temperature models available
- > Class I, Div. II certification



: Three-Way Communication

The ICF-1150 series support 2 serial ports, with a D-sub9 connector for RS-232 communication and a removable terminal block for RS-422 or RS-485 communication. The 3 ports (2 serial ports and one fiber port) are completely independent. When an ICF-1150 converter receives data from any one port, it will send the data out through the other 2 ports. For example, once the ICF-1150 converter receives

a command from the remote master through the fiber port, it will convert the signal and send the command through the RS-232 and RS-422/485 ports at the same time. If the user is monitoring a system running on an RS-485 network, there is no need to use an additional RS-232 to RS-485 converter to connect the laptop computer's serial port to the RS-485 bus.

: Rotary Switch for Setting the Pull High/Low Resistor

The RS-485 interface supports multi-drop or daisy-chain connections, which system engineers will use to connect serial devices such as meters, RTUs, and readers together on the same bus. Since the number of serial devices on the same bus will cause the impedance

of the data line to increase, the ICF-1150 allows users to tune the pull high/low resistor. Just rotate the switch to the appropriate value without removing the ICF-1150 from the DIN-rail.

Pull High/Low Resistor Values

Position	0	1	2	3	4	5	6	7	8	9
ohms	150K	10K	4.7K	3.3K	1K	909	822	770	500	485

: Specifications

Optical Fiber Side

Fiber Connector: SC or ST

Cable Requirements:

Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μ m

Multi-mode: 50/125, 62.5/125, or 100/140 μ m

Transmission Distance:

Single-mode: 40 km

Multi-mode: 5 km

Wavelength:

ICF-1150-S (single-mode): 1310 nm

ICF-1150-M (multi-mode): 850 nm

Tx Output:

ICF-1150-S (single-mode): > -5 dBm

ICF-1150-M (multi-mode): > -5 dBm

Rx Sensitivity:

ICF-1150-S (single-mode): -25 dBm

ICF-1150-M (multi-mode): -20 dBm

Point-to-Point Transmission: Half-duplex or full-duplex

Ring Transmission: Half-duplex

RS-232/422/485 Side

RS-232 Signals: TxD, RxD, GND

RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-2w Signals: Data+, Data-, GND

Baudrate: 50 bps to 921.6 Kbps

ESD Protection: 15 KV for all signals

Isolation: 2 KV RMS isolation per I/O port for 1 minute

Physical Characteristics

Housing: Metal

Dimensions: 30.3 x 70 x 115 mm (1.19 x 2.76 x 4.53 in)

Weight: 330 g

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC

Power Consumption:

ICF-1150: 127 mA @ 12 V

ICF-1150I: 163 mA @ 12 V

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: 1.1 A (protects against two signals shorted together)

Standards and Certifications

Safety: UL 508

Hazardous Location: UL/cUL Class I Division 2 Groups A/B/C/D, ATEX Zone 2 EEx nC IIC

EMC: CE, FCC

EMI: EN 55022 Class B, FCC Part 15 Subpart B Class B

EMS:

EN 61000-4-2 (ESD) Level 4,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 4,

EN 61000-4-5 (Surge) Level 3,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (PFMF) Level 3

Freefall: IEC 60068-2-32

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 792,085 hrs

Database: Telcordia (Bellcore), GB

Water and Dust Proof: IP30

Warranty

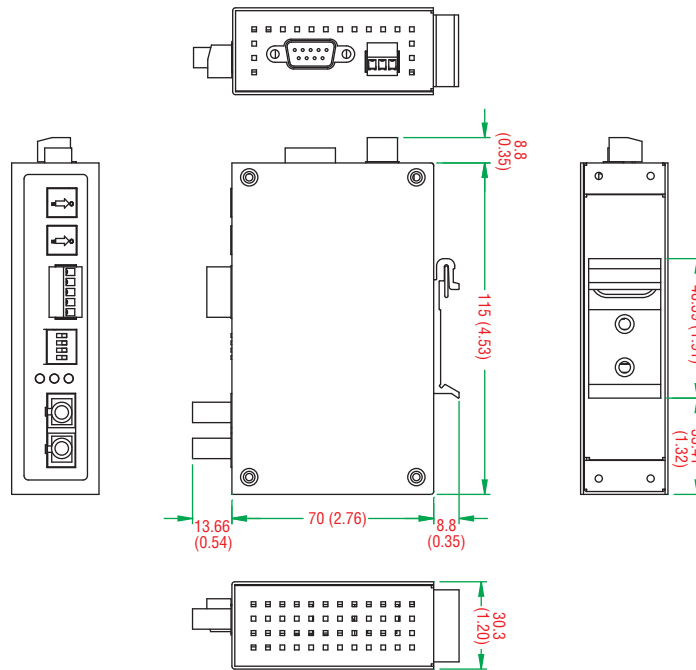
Warranty Period: 5 years

Details: See www.moxa.com/warranty

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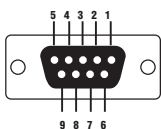
Dimensions

Unit: mm (inch)



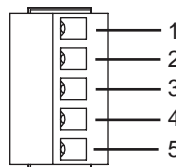
Pin Assignment

DB9 female connector



Pin	RS-232
1	—
2	TxD
3	RxD
4	—
5	GND
6	—
7	—
8	—

Terminal block connector



Pin	RS-422/485-4w	RS-485-2w
1	GND	GND
2	RxD-(A)	Data-(A)
3	RxD+(B)	Data+(B)
4	TxD-(A)	—
5	TxD+(B)	—

Ordering Information

Available Models

ICF-1150-M-SC: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 0 to 60°C operating temperature
ICF-1150-M-ST: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 0 to 60°C operating temperature
ICF-1150-S-SC: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 0 to 60°C operating temperature
ICF-1150-S-ST: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 0 to 60°C operating temperature
ICF-1150I-M-SC: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-M-ST: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-S-SC: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-S-ST: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150-M-SC-T: Industrial RS-232/422/485 to multimode fiber converter, SC connector, -40 to 85°C operating temperature
ICF-1150-M-ST-T: Industrial RS-232/422/485 to multimode fiber converter, ST connector, -40 to 85°C operating temperature
ICF-1150-S-SC-T: Industrial RS-232/422/485 to single mode fiber converter, SC connector, -40 to 85°C operating temperature
ICF-1150-S-ST-T: Industrial RS-232/422/485 to single mode fiber converter, ST connector, -40 to 85°C operating temperature
ICF-1150I-M-SC-T: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-M-ST-T: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-S-SC-T: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-S-ST-T: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 2 KV isolation, -40 to 85°C operating temperature

Optional Accessories

DR-4524: 45 W, 2 A Din-Rail 24 VDC power supply with universal 85 to 264 VAC input

Package Checklist

- 1 ICF-1150 series fiber converter
- Quick installation guide (printed)
- Warranty card

TCF-142 Series

RS-232/422/485 to optical fiber media converters



TCF-142-S-ST

TCF-142-S-SC



- > “Ring” and “Point-to-Point” transmission
- > Extends RS-232/422/485 transmission up to:
 - 40 km with single-mode—TCF-142-S
 - 5 km with multi-mode—TCF-142-M
- > Decreases signal interference
- > Protects against electrical interference and chemical corrosion
- > Supports baudrates up to 921.6 Kbps
- > Wide temperature models available (-40 to 75°C)



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Serial Media Converters > TCF-142 Series

: Introduction

The TCF-142 media converters are equipped with a multiple interface circuit that can handle RS-232 or RS-422/485 serial interfaces and multi-mode or single-mode fiber. TCF-142 converters are used to extend serial transmission up to 5 km (TCF-142-M with multi-mode

fiber) or up to 40 km (TCF-142-S with single-mode fiber). The TCF-142 converters can be configured to convert either RS-232 signals, or RS-422/485 signals, but not both at the same time.

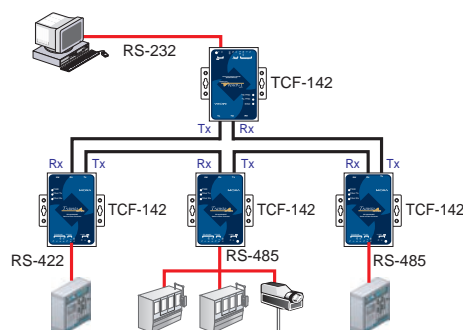
: Automatic Baudrate Detection

The TCF-142 converters can automatically detect the serial baudrate. This is an extremely convenient feature. Even if a device's baudrate

is changed, the signal will still be transmitted through the media converter without any data loss.

: Ring Operation

The TCF-142 converters can be used to connect serial devices to a fiber ring. To form the ring, connect the Tx port of one TCF-142 to the Rx port of a neighboring converter. Once the ring is set up, simply use the DIP switches to configure the TCF-142 converters for “ring mode.” When one node transmits a signal, the signal travels around the ring until it returns back to the transmitting unit, which then blocks the signal. With the TCF-142, you can set up fiber rings that have a total circumference of up to 100 km.



: Automatic Data Direction Control (ADDC®)

ADDC® is a patented hardware data flow solution developed by Moxa to handle RS-485 data direction control. ADDC® senses and controls

RS-485 data direction automatically, making it unnecessary to use the hand shaking signal.

Specifications

Optical Fiber Side

Fiber Connector: SC or ST

Cable Requirements:

Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm

Multi-mode: 50/125, 62.5/125, or 100/140 μm

Transmission Distance:

Single-mode: 40 km

Multi-mode: 5 km

Wavelength:

Single-mode: 1310 nm

Multi-mode: 850 nm

Tx Output:

Single-mode: > -5 dBm

Multi-mode: > -5 dBm

Rx Sensitivity:

Single-mode: -25 dBm

Multi-mode: -20 dBm

Point-to-Point Transmission: Half-duplex or full-duplex

Ring Transmission: Half-duplex

RS-232/422/485 Side

Connector: Terminal Block

RS-232 Signals: Tx, Rx, GND

RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-2w Signals: Data+, Data-, GND

Baudrate: 50 bps to 921.6 Kbps

ESD Protection: 15 KV for all signals

Physical Characteristics

Housing: Metal

Dimensions:

Without ears: 67 x 100 x 22 mm (2.64 x 3.94 x 0.87 in)

With ears: 90 x 100 x 22 mm (3.54 x 3.94 x 0.87 in)

Weight: 320 g

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 75°C (-40 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC

Power Consumption: 140 mA @ 12 V

Power Line Protection:

2 KV Burst (EFT), EN61000-4-4

2 KV Surge, EN61000-4-5

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: 1.1 A (protects against two signals shorted together)

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B, EN 55022 Class B

EMS:

EN 61000-4-2 (ESD) Level 3,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 2,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (SFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 780,480 hrs

Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

DIP Switch Settings

Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	ON	ON
RS-485-4w	OFF	OFF
RS-485-2w	OFF	ON

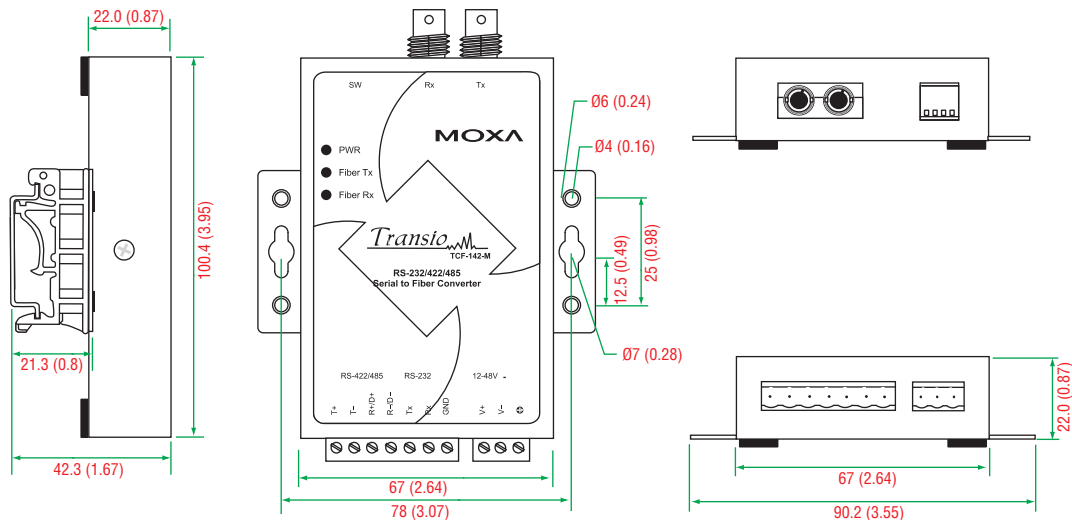
Built-in 120-ohm Terminator	SW3
Enable	ON
Disable	OFF

Fiber Mode	SW4
Ring mode	ON
Point-to-Point mode	OFF

Dimensions

TCF-142-M/S-ST

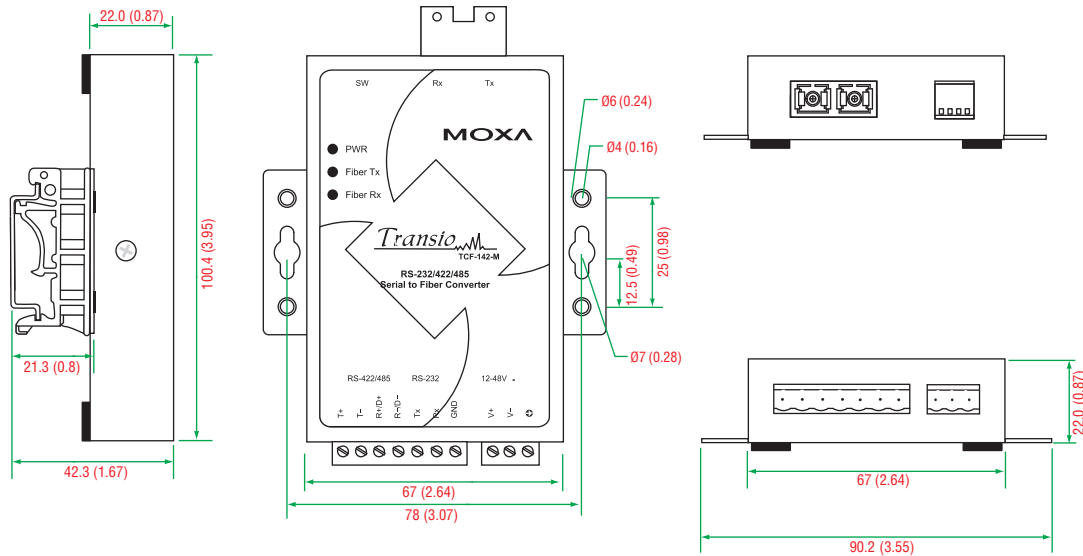
Unit: mm (inch)



Dimensions

TCF-142-M/S-SC

Unit: mm (inch)



: Ordering Information

Available Models

TCF-142-M-SC: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector, 0 to 60°C operating temperature

TCF-142-M-ST: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector, 0 to 60°C operating temperature

TCF-142-S-SC: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector, 0 to 60°C operating temperature

TCF-142-S-ST: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector, 0 to 60°C operating temperature

TCF-142-M-SC-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C operating temperature

TCF-142-M-ST-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C operating temperature

TCF-142-S-SC-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C operating temperature

TCF-142-S-ST-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C operating temperature

Package Checklist

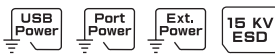
- 1 TCF-142 media converter
- Power jack to 3-pin terminal block adaptor
- Stick-on pads
- Quick installation guide (printed)
- Warranty card

TCF-90 Series

Port-powered RS-232 to optical fiber media converters



- Use either external power or power over serial
- Extends RS-232 transmission up to:
 - 40 km with single-mode—TCF-90-S
 - 5 km with multi-mode—TCF-90-M
- Reduces signal interference
- Protects against electrical interference or chemical corrosion
- 15 KV ESD protection for serial signals
- Compact size



Specifications

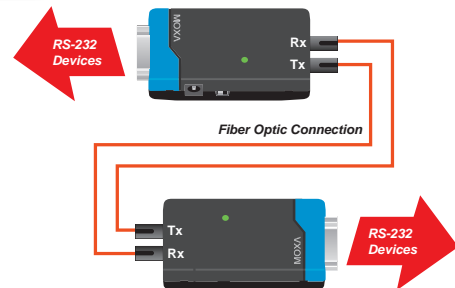
The TCF-90 is a compact media converter that transmits RS-232 signals over optical fiber. Power is derived from either the serial port or an external power source. The TCF-90 extends RS-232 transmission up to 5 km with multi-mode fiber, or up to 40 km with single-mode fiber. A pair of TCF-90 converters can be used to connect two RS-232

devices with optical fiber in full duplex mode. The optical fiber isolates the data signals from dangerous increases in ground potential, ground loops, and electrical EMI/RFI noise, and enhances data security by eliminating the harmful effects of RF radiation and susceptibility to electromagnetic radiation.

Self-powered RS-232 to Optical Fiber

Connecting RS-232 devices to the TCF-90 is easy. The ST-type optical fiber connector is designed especially for data communication applications that transmit data either between or within buildings. The TCF-90 can be used for industrial applications and for applications that require secure data transfer.

The RS-232 port on the TCF-90 uses a DB9 female socket to connect directly to the host PC, with power drawn from the TxD, RTS, and DTR lines. Although the TCF-90 can obtain enough power from the three data/handshake lines whether the signal is high or low, we strongly recommend setting either the RTS or DTR signal to ON.



LED Port Power Indicator

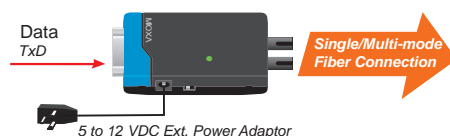
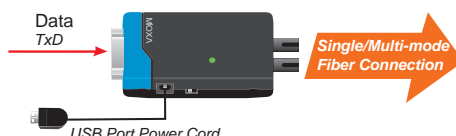
It's easy enough to use a multimeter to test if the serial device is supplying the TCF-90 with enough power through the serial connection, but why bother when the TCF-90 can do the testing for you? Connect the TCF-90 to the device's RS-232 port and set the SW4 switch to Test mode. If the port power LED indicator lights up, the TCF-90 is receiving enough power. If the LED does NOT light up, you will need to attach an external power source to the TCF-90.



Optional External Power Source

In most circumstances, the TCF-90 should be able to operate without using an external power source. However, an external USB power cord or DC power supply can be used in situations where the handshake

lines are not available, both the RTS/DTR signals are set to OFF, or the attached device's serial interface chip provides less power than required.



: Specifications

Optical Fiber Side

Fiber Connector: ST

Cable Requirements:

Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm

Multi-mode: 50/125, 62.5/125, or 100/140 μm

Transmission Distance:

Single-mode: 40 km

Multi-mode: 5 km

Wavelength:

Single-mode: 1310 nm

Multi-mode: 850 nm

Tx Output:

Single-mode: > -5 dBm

Multi-mode: > -5 dBm

Rx Sensitivity:

Single-mode: -24 dBm

Multi-mode: -20 dBm

RS-232 Side

Connector: DB9 female

Signals:

RS-232 Tx, Rx, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)

Baudrate: 300 bps to 115.2 Kbps

Physical Characteristics

Housing: ABS + PC

Dimensions: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)

Weight: 150 g

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Input Power: RS-232 port (TxD, RTS, DTR) or power input jack

Input Voltage: 5 to 12 VDC

Power Consumption: 20 mA @ 5 V (with termination disabled)

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B

EMS:

IEC 61000-4-2 (ESD) Level 2,

IEC 61000-4-3 (RS) Level 2,

IEC 61000-4-4 (EFT) Level 2,

IEC 61000-4-5 (Surge) Level 3,

IEC 61000-4-6 (CS) Level 2,

IEC 61000-4-8 (SFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 2,272,562 hrs

Database: MIL-HDBK-217F

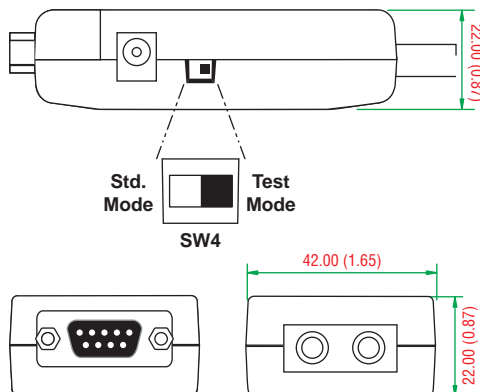
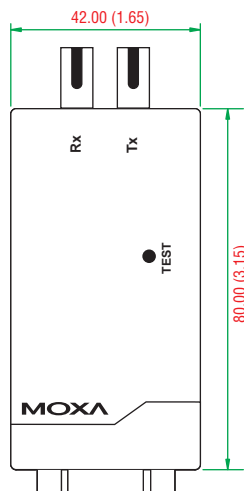
Warranty

Warranty Period: 5 years

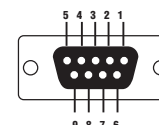
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



DB9 female connector



PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

: Ordering Information

Available Models

TCF-90-M: Port-powered RS-232 to multi-mode optical fiber converter with ST connector for 5 km transmission

TCF-90-S: Port-powered RS-232 to single-mode optical fiber converter with ST connector for 40 km transmission

Note: Models with SC/FC connectors or a 60 km range are available by request.

Optional Accessories (can be purchased separately)

Power Adaptor: See Appendix A for details

CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist

- 1 TCF-90 series media converter
- USB power cord (50 cm)
- Quick installation guide
- Warranty card

TCC-100/100I Series

Industrial RS-232 to RS-422/485 converters with optional 2 KV isolation



- > RS-232 to RS-422 conversion with RTS/CTS support
- > RS-232 to 2-wire or 4-wire RS-485 conversion
- > 2 KV isolation protection (TCC-100I)
- > Wall and DIN-Rail mounting
- > Plug-in terminal block for easy RS-422/485 wiring
- > LED indicators for power, Tx, Rx
- > Wide temperature model available (-40 to 85°C)



Introduction

The TCC-100/100I series RS-232 to RS-422/485 converters increase networking capability by extending the RS-232 transmission distance. Both converters have a superior industrial-grade design that includes

DIN-rail mounting, terminal block wiring, external terminal block for power, and optical isolation (TCC-100I and TCC-100I-T only). The TCC-100/100I series converters are ideal solutions for converting RS-232 signals to RS-422/485 in critical industrial environments.

Specifications

RS-232 Side

Connector: DB9 female

Signals: Tx, Rx, RTS, CTS, GND

RS-422/485 Side

Connector: Terminal Block

Signals:

(interface selected by DIP switch)

RS-422: Tx+, Tx-, Rx+, Rx-, RTS, CTS, GND

RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND

RS-485-2w: Data+, Data-, GND

RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication

Baudrate: 50 bps to 921.6 Kbps

ESD Protection: 15 KV

Optical Isolation: 2 KV (TCC-100I/100I-T)

Physical Characteristics

Housing: Metal

Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)

Weight: 148 ± 5 g

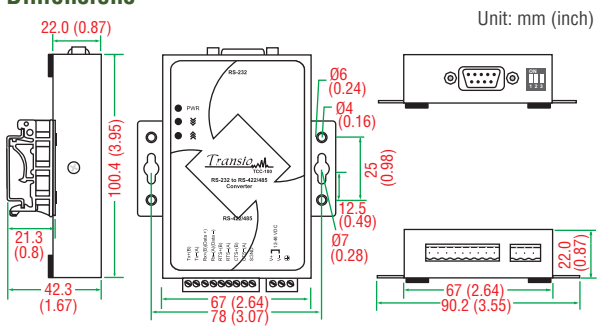
Environmental Limits

Operating Temperature:

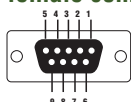
Standard Models: -20 to 60°C (-4 to 140°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Dimensions



DB9 female connector



PIN	RS-232	PIN	RS-232
1	—	5	GND
2	TxD	6	—
3	RxD	7	CTS
4	—	8	RTS

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Input Power: Power input jack

Input Voltage: 12 to 48 VDC

Power Consumption:

TCC-100/100-T: 85 mA @ 12 V

TCC-100I/100I-T: 150 mA @ 12 V

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: Protects against two signals shorted together

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B

EMS:

IEC 61000-4-2 (ESD) Level 2,

IEC 61000-4-3 (RS) Level 2,

IEC 61000-4-4 (EFT) Level 2,

IEC 61000-4-5 (Surge) Level 2,

IEC 61000-4-6 (CS) Level 2,

IEC 61000-4-8 (SFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 3,017,857 hrs

Database: MIL-HDBK-217F

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Ordering Information

Available Models

TCC-100: RS-232 to RS-422/485 converter, -20 to 60°C operating temperature

TCC-100I: RS-232 to RS-422/485 converter with optical isolation, -20 to 60°C operating temperature

TCC-100-T: RS-232 to RS-422/485 converter, -40 to 85°C operating temperature

TCC-100I-T: RS-232 to RS-422/485 converter with optical isolation, -40 to 85°C operating temperature

Package Checklist

- 1 TCC-100/100I media converter
- DK-35A: DIN-Rail mounting kit
- Power jack to 3-pin terminal block adaptor
- Quick installation guide (printed)
- Warranty card

TCC-80/80I Series

Port-powered RS-232 to RS-422/485 converters with optional 2.5 KV isolation



- > External power source supported but not required
- > Compact size
- > Converts RS-422, and both 2-wire and 4-wire RS-485
- > RS-485 automatic data direction control
- > Automatic baudrate detection
- > 15 KV serial ESD protection
- > Built-in 120-ohm termination resistors
- > 2.5 KV isolation (for TCC-80I only)
- > LED port power indicator



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Serial Media Converters > TCC-80/80I Series

Introduction

The TCC-80/80I media converters provide complete signal conversion between RS-232 and RS-422/485, without requiring an external power source. The converters support both half duplex 2-wire RS-485 and full duplex 4-wire RS-422/485, either of which can be converted between RS-232's Tx and Rx lines. In addition, the TCC-80/80I's 15 KV ESD protection guards against damage from electrostatic discharge, and the TCC-80I is the world's first high-speed, port-powered converter with 2.5 KV isolation.

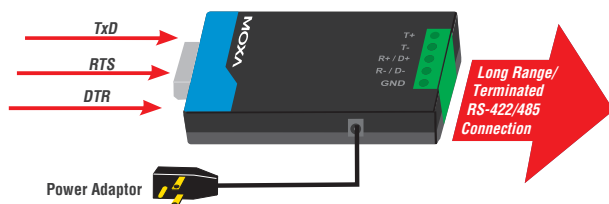
Automatic data direction control is provided for RS-485. In this case, the RS-485 driver is enabled automatically when the circuitry senses the Tx output from the RS-232 signal. This means that no programming effort is required to control the transmission direction of the RS-485 signal. Moreover, the TCC-80I's patented LED port power indicator lets you check whether or not the TCC-80I is receiving enough power.

Port Power over RS-232

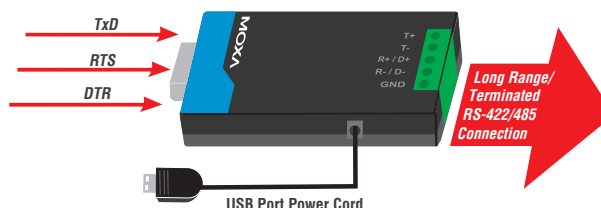
The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the Tx line. Regardless of whether the signal is high or low, the TCC-80/80I can obtain enough power from the data line. However, external power can be used if the handshake line is not available, if the serial cable is too long, or if the RS-232 device is a low power device. For external power, a 5 to 12 VDC power supply can be connected using an adaptor or a USB power cord.



External Power Adaptor



USB Power



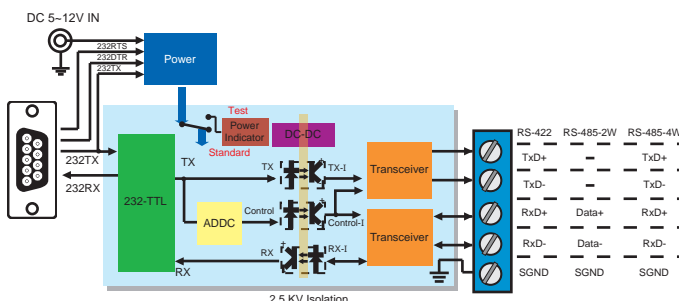
Port Power Dissipation

When installing a TCC-80 or TCC-80I converter, it is important to pay attention to power consumption, RS-232 cable length, and RS-422/485 transmission distance. In general, the TCC-80 and TCC-80I obtain 50 mW of power from the power source. Standard PC COM ports can provide 70 to 90 mW of power if the Tx, D, and DTR

lines are connected. Moreover, the RS-232 cable should be shorter than 15 m (@ 9600 bps) to ensure that less power is lost from the host/device to the TCC-80. The remainder of the supplied power is used for transmitting the RS-422/485 signal.

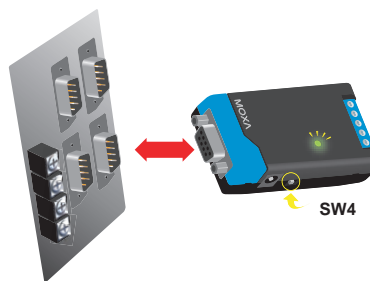
Port Power and Optical Isolation

The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the Tx, D, and DTR lines. Electrical 2.5 kV isolation for the TCC-80I is achieved with a photo coupler that transforms the electrical signal into light, and then re-transforms the light back into an electrical signal on the other side. In this way, the two electrical circuits are completely isolated from each other. This also protects the devices from ground loop currents, reduces damage caused by data loss, and prevents damage to the communication interfaces.



LED Port Power Indicator

It's easy enough to test the serial device with a multimeter to determine that the serial device will provide enough power to the media converter. However, it's even easier to let the TCC-80I test the device for you. Simply connect the TCC-80I to the device's RS-232 port and set the SW4 switch to Test mode. If the patented port power LED indicator lights up, the TCC-80I is receiving enough power. If the LED does not light up, you will need to attach an external power source to the TCC-80I.



Specifications

RS-232 Side

Connector: DB9 female

Signals:

RS-232: Tx, Rx, GND

(Loop-back wiring: RTS to CTS, DTR to DSR and DCD)

RS-422/485 Side

Connector: Terminal Block or DB9 male

Signals:

(interface selected by DIP switch)

RS-422: Tx+, Tx-, Rx+, Rx-, GND

RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND

RS-485-2w: Data+, Data-, GND

RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication

Baudrate: 50 bps to 115.2 Kbps

ESD Protection: 15 kV

Optical Isolation: 2.5 kV rms for 1 minute (TCC-80I only)

Physical Characteristics

Housing: ABS + PC

Dimensions:

TCC-80/80I: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)

TCC-80-DB9/80I-DB9: 42 x 91 x 23.6 mm (1.65 x 3.58 x 0.93 in)

Weight: 50 ± 5 g

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Input Power: RS-232 port (Tx, D, DTR) or power input jack

Input Voltage: 5 to 12 VDC

Power Consumption:

TCC-80: 10 mA @ 5 V (with termination disabled)

TCC-80I: 20 mA @ 5 V (with termination disabled)

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B

EMS:

EN 61000-4-2 (ESD) Level 2,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 3,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (SFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 2,781,161 hrs

Database: Telcordia (Bellcore), GB

Warranty

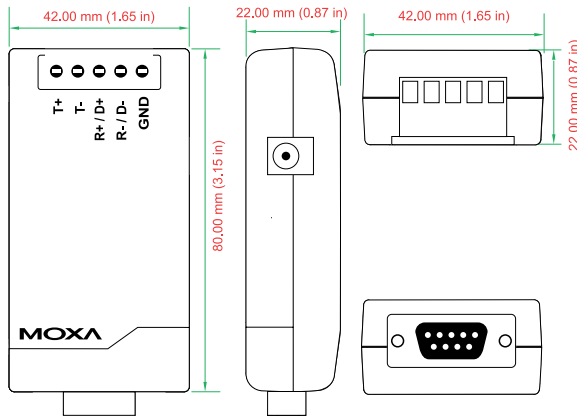
Warranty Period: 5 years

Details: See www.moxa.com/warranty

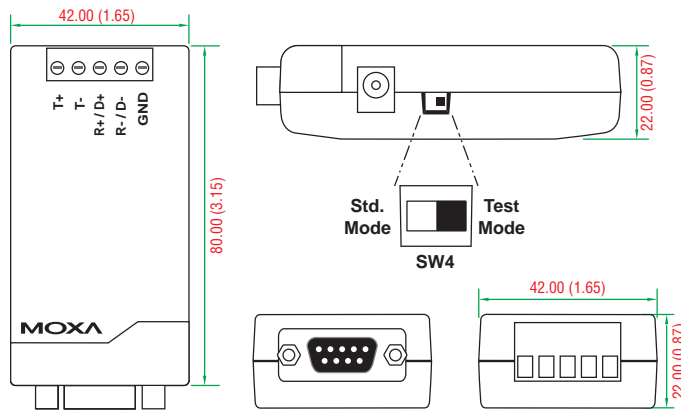
Dimensions

Unit: mm (inch)

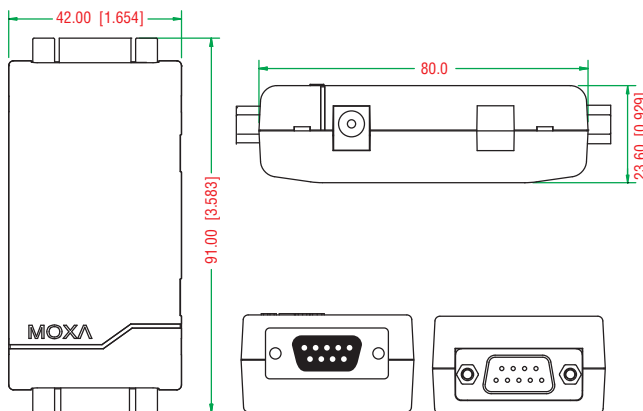
TCC-80



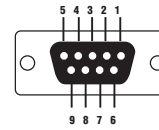
TCC-801



TCC-80-DB9, TCC-801-DB9



DB9 female connector



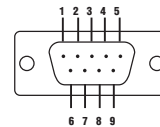
PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

DIP Switch Settings



DIP Switch Settings			
RS-422 with Terminator	SW1	SW2	SW3
RS-422	OFF	OFF	ON
4-wire RS-485 with Terminator	SW1	SW2	SW3
4-wire RS-485	ON	OFF	OFF
2-wire RS-485 with Terminator	SW1	SW2	SW3
2-wire RS-485	ON	ON	OFF

DB9 male RS-422/485 port



PIN	RS-422/RS-485-4w	RS-485-2w
1	TxD+(B)	–
2	TxD-(A)	–
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(A)
5	GND	GND
6	–	–
7	–	–
8	–	–

Ordering Information

Available Models

TCC-80: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and terminal block on the RS-422/485 side

TCC-80-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and DB9 male connector on the RS-422/485 side

TCC-801: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, terminal block on the RS-422/485 side, and 2.5 KV optical isolation

TCC-801-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, DB9 male connector on the RS-422/485 side, and 2.5 KV optical isolation

Optional Accessories (can be purchased separately)

CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Power Adaptor: See Appendix A for details

Package Checklist

- 1 TCC-80 or TCC-801 media converter
- USB power cord (50 cm)
- Quick installation guide (printed)
- Warranty card

TCC-120/120I

Industrial RS-422/485 converters/repeaters with optional 2 KV isolation



- > Boost serial signal to extend transmission distance
- > Wall or DIN-Rail mounting
- > Terminal block for easy wiring
- > Power input from terminal block
- > DIP switch setting for built-in terminator (120 ohm)
- > Boost RS-422 or RS-485 signal, or convert RS-422 to RS-485
- > 2 KV isolation protection (TCC-120I)



Introduction

The TCC-120 and TCC-120I are RS-422/485 converters/repeaters designed to extend RS-422/485 transmission distance. Both products have a superior industrial-grade design that includes

DIN-rail mounting, terminal block wiring, and external terminal block for power. In addition, the TCC-120I supports optical isolation for system protection. The TCC-120 and TCC-120I are ideal RS-422/485 converters/repeaters for critical industrial environments.

Specifications

Serial Communication

Connectors: Terminal Block on both ends

Baudrate: 50 bps to 921.6 Kbps

Signals:

RS-422/485-4w: TxD+, TxD-, RxD+, RxD-

RS-485-2w: Data+, Data-

RS-485 Data Direction Control: ADDC® (automatic data direction control)

ESD Protection: 15 KV for all signals

Optical Isolation: 2 KV (TCC-120I only)

Physical Characteristics

Housing: Metal

Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)

Weight: 148 ± 5 g

Environmental Limits

Operating Temperature: -20 to 60°C (-4 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Power Input: Power input jack

Input Voltage: 12 to 48 VDC

Power Consumption:

TCC-120: 65 mA @ 12 V

TCC-120I: 180 mA @ 12 V

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: Protects against two signals shorted together

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B

EMS:

EN 61000-4-2 (ESD) Level 2,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 2,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (PFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 1,949,025 hrs

Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Ordering Information

Available Models

TCC-120: RS-422/485 converter/repeater

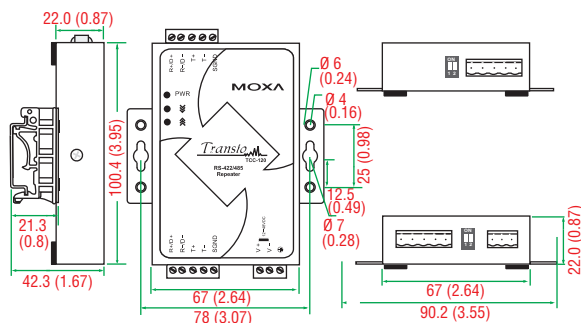
TCC-120I: RS-422/485 converter/repeater with 2 KV optical isolation

Package Checklist

- 1 TCC-120 or TCC-120I media converter
- DK-35A: DIN-Rail mounting kit
- Quick installation guide (printed)
- Warranty card

Dimensions

Unit: mm (inch)



TCC-82



Port-powered RS-232 4-channel isolator



- > 4 channels of 4 KV RMS isolation for 1 minute
- > External power source supported but not required
- > 15 KV serial ESD protection
- > Automatic baudrate detection
- > Compact size

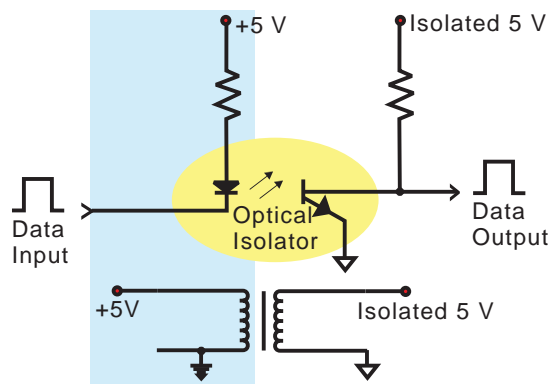


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Serial Media Converters > TCC-82

Introduction

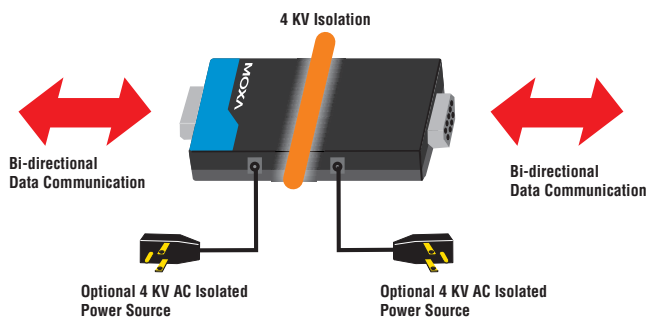
The TCC-82 provides full electrical isolation for bi-directional serial communication between two RS-232 devices in a compact, industrial-grade package. Both sides of an RS-232 connection are isolated optically to provide perfect protection against lightning surges, accidental high voltage shorts, and ground loops. The built-in, wide range isolators are tested to ensure that they can withstand more than 4 KV rms input to output for 1 minute. This means that the TCC-82 not only meets the requirements of general serial data communications, but also the high standards required by industrial automation and medical applications. The TCC-82 protects the Tx/D and Rx/D data lines, and also protects the RTS and CTS handshake lines for a total of 4 isolated channels to provide complete protection of your RS-232 applications.



External Power Source Not Required

The TCC-82 supports port-powered operation, which means that it can obtain power directly from the attached serial devices. Power is obtained from the RS-232 Tx/D, RTS, or DTR lines, regardless of whether the signal is high or low, eliminating the need for an external power supply. However, external power can be used if handshake lines are not available, if the serial cable is too long, or if the serial device is a low powered device. For external power, the TCC-82 can use a 5 to 12 VDC adaptor or a USB power cord. Note that both sides of the connection are powered independently, so if necessary, one side can rely on port power and the other on an external power source.

When installing the TCC-82, we recommend that you connect all output signals. The TCC-82 obtains power from these signals even if they are not used by your system. Care should be taken when choosing the external power supply if your application requires the full 4 KV of isolation. Most commercial power supplies provide only 1500 VAC isolation between the primary and secondary windings. If you are using external power for both sides of the TCC-82, make sure that separate power sources are used, each with sufficient isolation protection.



Specifications

Serial Communication

Connectors: DB9 male and DB9 female

Baudrate: 50 bps to 921.6 Kbps

Signals:

RS-232: TxD, RxD, RTS, CTS, GND

(Loop-back wiring: DTR to DSR and DCD)

ESD Protection: 15 KV for all signals

Optical Isolation: 4 KV for 1 minute

Physical Characteristics

Housing: ABS

Dimensions: 42 x 80 x 23.6 mm (1.65 x 3.15 x 0.93 in)

Weight: 60 ± 5 g

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Input Power: RS-232 port (TxD, RTS, DTR) or power input jack

Input Voltage: 5 to 12 VDC

Power Consumption: 20 mA @ 5 V

Standards and Certifications

Safety: UL 60950-1

EMC: CE, FCC

EMI: FCC Part 15 Subpart B Class B

EMS:

EN 61000-4-2 (ESD) Level 2,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 2,

EN 61000-4-5 (Surge) Level 2,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (SFMF) Level 1

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 959,780 hrs

Database: MIL-HDBK-217F

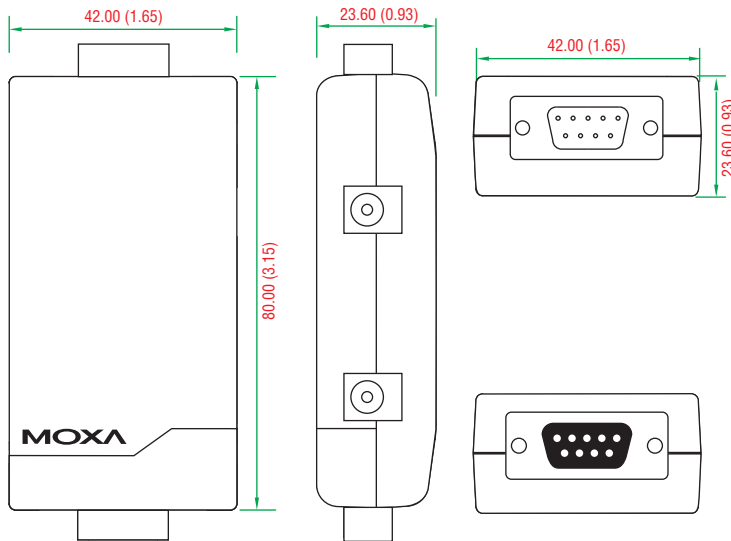
Warranty

Warranty Period: 5 years

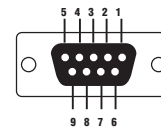
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)

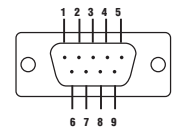


DB9 female connector



PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

DB9 male connector



PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

Ordering Information

Available Models

TCC-82: Port-powered RS-232 isolator with 4 KV isolation and 15 KV serial ESD protection

Optional Accessories (can be purchased separately)

Power Adaptor: See Appendix A for details

CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist

- 1 TCC-82 RS-232 isolator
- USB power cord (50 cm) x 2
- Quick installation guide (printed)
- Warranty card

Introduction to CAN-to-Fiber Media Converters

: Introduction to CAN

CAN is a serial communications bus defined by the International Standardization Organization (ISO). The CAN serial bus was introduced in 1986 as the "Automotive Serial Controller Area Network," a multimaster message broadcast system that specifies a maximum signaling rate of 1 Mbps. It was soon discovered that CANbus worked extremely well for many other applications, including weaving machines, elevator systems in large buildings, ships, trains, aircraft,

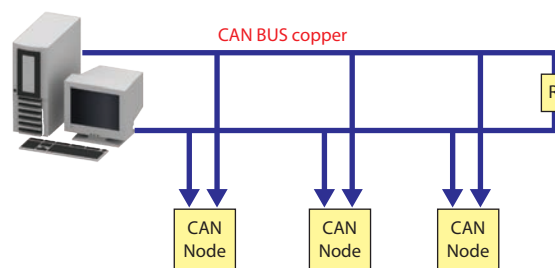
x-ray machines and other medical equipment, logging equipment, tractors and combines, coffee makers, and major appliances. CAN systems are extremely versatile. Technicians find it easy to repair or replace computer hardware in a CAN system without affecting the rest of the network in any way, and design engineers can easily modify existing CAN systems for other uses by adding or remove network nodes.

: Why CAN-to-Fiber Media Converters?

Many applications require connecting large numbers of CAN devices in a complex environment. However, since there is a limit to the driving capability of CANbus, users may not be able to set up as many CAN devices as they would like. In addition, variations in the allowed segment lengths, which result from the fact that different types of wire are used, poses additional limitations. Note that device numbers and segment lengths are dictated by the ISO 11898-2 standard.

CAN converters are used to get around the limitation on the number of CAN devices and the upper limit of segment lengths. Most installers use optical fiber to extend to longer transmission distances since the fiber will not corrupt the CANbus signal. CAN-to-fiber converters not only can solve the problem of extending transmission distance, but will also guarantee more secure data transmission and will not limit the number of CAN devices that can be used. The ICF-1170I is a CAN-to-fiber converter that secures data transmission by using fiber optic transmission to provide complete isolation and protection against EMI. The ICF-1170I series can separate and protect critical segments of the system from the rest of the CAN network and is protocol independent, allowing it to work with all of the different CAN protocols and frame lengths.

Typical Installation



: Overview of the ICF-1170I CAN-to-Fiber Converter

The ICF-1170I series CAN-to-fiber converters provide secure data transmission by using fiber optic transmission to provide complete isolation and protection against EMI. The ICF-1170I series can

separate and protect critical segments of the system from the rest of the CAN network and is protocol independent, allowing it to work with all of the different CAN protocols and frame lengths.

Typical CAN application that uses a CAN-to-fiber converter



Special Features

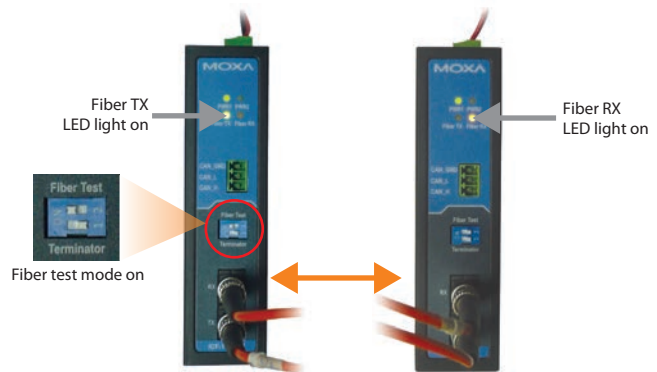
Fiber Test Mode

The ICF-1170I supports a special feature called Fiber Test Mode, which is easily activated with a DIP switch on the ICF-1170I's outer panel. Fiber Test Mode can be used to test the fiber cable between two ICF-1170I units, and provides a simple way to determine if the fiber cable is transmitting data correctly.

When in Fiber Test Mode, the fiber transceiver (TX) will continuously send out a data signal and the "Fiber TX" LED will light up. On the other side of the connection, when the ICF-1170I fiber transceiver (RX) receives the data signal from the TX side, the "Fiber RX" LED will light up.

If both the "Fiber TX" and "Fiber RX" LEDs light up at the same time, it means the fiber transmission between the two converters is okay, and the fiber cable is connected properly. If the test fails, you should check the fiber cable and fiber connectors to determine the cause of the transmission error.

Fiber optic communication is working properly when both the TX and RX LEDs will light up.



Redundant Power

To help ensure that your system works non-stop, the ICF-1170I CAN-to-fiber converter comes with a built-in redundant power input that is activated automatically when the primary power input fails. In addition,

an alarm contact will be activated when the redundant power input is activated.

Isolation Protection

A special feature of the ICF-1170I CAN-to-fiber converter is its 2 KV isolation protection to protect the converter in environments with high electromagnet activity.

ICF-1170I Series



Industrial CAN-to-fiber converters



15 KV
ESD

- > Transmits up to 2 km over optical fiber
- > Converts CAN signals to fiber and fiber to CAN signals
- > Baudrate up to 1 Mbps
- > Dual power inputs for redundancy
- > DIP switch for 120 ohm terminal resistance
- > DIP switch for fiber test mode
- > LEDs for Fiber TX, Fiber RX, Power 1, Power 2
- > Wide temperature model available for -40 to 85°C environments
- > Fully compatible with the ISO 11898 standard



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Serial Media Converters > ICF-1170I Series

Introduction

The ICF-1170I series CAN-to-fiber converters are used to convert CAN signals from copper to optical fiber. The converters come with 2 KV optical isolation for the CANbus system and dual power inputs with

alarm contact relay to ensure that your CANbus system will remain online.

Fiber Test Mode

Fiber Test Mode can be used to test the fiber cable between two ICF-1170I units, and provides a simple way to determine if the fiber cable is transmitting data correctly. When in Fiber Test Mode, the fiber transceiver (TX) will continuously send out a data signal and the "Fiber

TX" LED will light up. On the other side of the connection, when the ICF-1170I fiber transceiver (RX) receives the data signal from the TX side, the "Fiber RX" LED will light up.

Specifications

CAN Communication

CAN Interface: ISO 11898-2, Terminals (CAN_H, CAN_L, CAN_GND)

Protocols: CAN 2.0A and 2.0B (ISO 11898-2)

Connector Type: 3-pin removable screw terminal x1

Termination Resistor: Dip switch selector for 120 Ω terminal resistor

Transfer Rate: Up to 1 Mbps

System Delay: 150 ns

Isolation Protection: 2 KV

ESD Protection: Supports 15 KV

Transmission Distance: Max 2 km (depends on the data rate and the protocol used)

Note: The transmission distance is limited by the signal rate, as indicated in the ISO 11898-2 standard.

LED Indicators: PWR1, PWR2, Fiber TX, Fiber RX

Fiber Communication

Connector Type: ST (multi-mode) fiber ports

Support Cable: 50/125, 62.5/125, or 100/140 μm (multi-mode)

Wavelength: 850 nm

TX Output: Multi-mode (> -5 dBm)

Rx Sensitivity: Multi-mode (-20 dBm)

Physical Characteristics

Housing: Metal

Dimensions: 30.3 x 70 x 115 mm (1.19 x 2.76 x 4.53 in)

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC dual power inputs for redundant power

Power Consumption:

ICF-1170I: 221 mA @ 12 V

Alarm Contact: 1 relay output with current carrying of 1 A @ 24 VDC

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: 1.1 A (protects against two signals shorted together)

Standards and Certifications

Safety: UL 508, EN 60950-1

EMC: CE, FCC

EMI: EN 55022 Class A, FCC Part 15 Subpart B Class A

EMS:

EN 61000-4-2 (ESD) Level 4,

EN 61000-4-3 (RS) Level 2,

EN 61000-4-4 (EFT) Level 4,

EN 61000-4-5 (Surge) Level 3,

EN 61000-4-6 (CS) Level 2,

EN 61000-4-8 (PFMF) Level 3

Freefall: IEC 60068-2-32

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 792,085 hrs

Database: Telcordia (Bellcore), GB

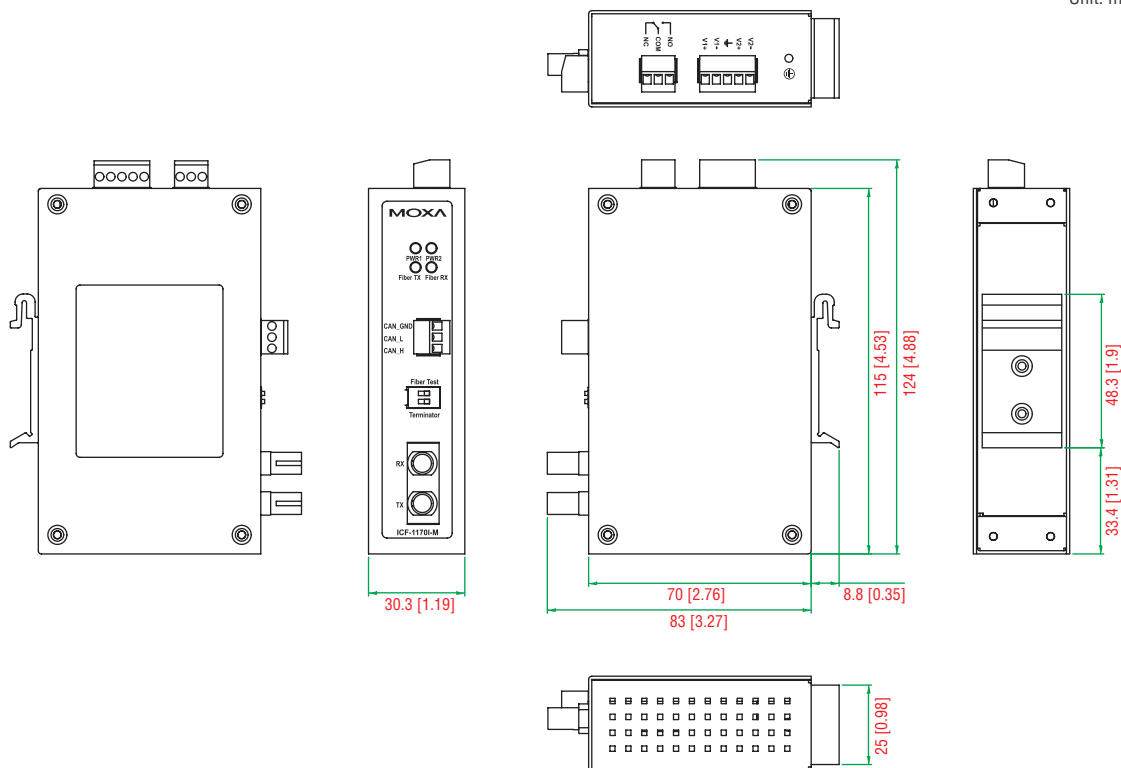
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



Ordering Information

Available Models

ICF-1170I-M-ST: CAN-to-fiber converter, multi-mode, ST connector, 0 to 60°C

ICF-1170I-M-ST-T: CAN-to-fiber converter, multi-mode, ST connector, -40 to 85°C

Package Checklist

- 1 ICF-1170I CAN-to-fiber converter
- Quick installation guide (printed)
- Warranty card

ICF-1180I Series

Preliminary



PROFIBUS-to-fiber converters



- > Wide temperature model available for -40 to 75°C environments
- > 2KV galvanic isolation protection
- > Dual power input for redundant
- > Auto baudrate detection and data speed up to 12Mbps
- > Single ring transmission
- > Extends PROFIBUS transmission distance up to 45km
- > Alarm by relay output
- > PROFIBUS bus fail prevents corrupted datagram in functioning segment



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Serial Media Converters > ICF-1180I Series

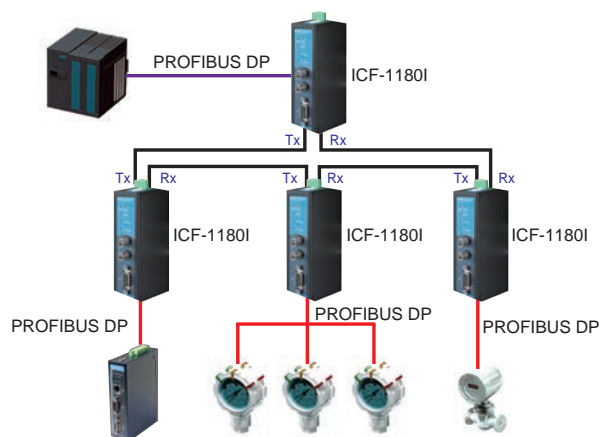
: Overview

The ICF-1180I series PROFIBUS-to-fiber converters are used to convert PROFIBUS signals from copper to optical fiber. The converters are used to extend serial transmission up to 4 km (multi-mode fiber)

or up to 45 km (single-mode fiber). The ICF-1180I provides 2 KV isolation protection for the PROFIBUS system and dual power inputs to ensure that your PROFIBUS device will perform uninterrupted.

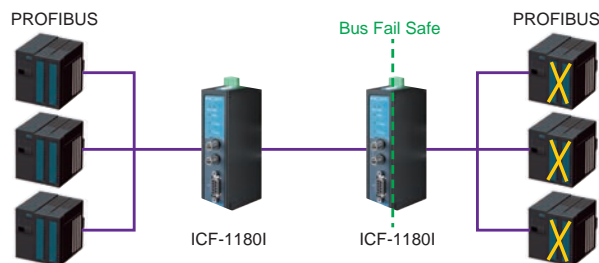
: Ring Operation

The ICF-1180I converters can be used to connect serial devices to a fiber ring. To form the ring, connect the Tx port of one ICF-1180I to the Rx port of a neighboring converter. Once the ring is set up, simply use the DIP switches to configure the ICF-1180I converters for "single ring mode." When one node transmits a signal, the signal travels around the ring until it returns back to the transmitting unit, which then blocks the signal. With the ICF-1180I, you can set up fiber rings and connect up to 126 nodes in a ring.



: PROFIBUS Fail Safe

When the PROFIBUS device malfunctions or the serial interface fails, it will generate electrical noise, resulting in bus failure. Traditional media converters will let the noise signal pass through the fiber and on to the other converter. This will disrupt data transmissions between the two buses and eventually communication ceases across the entire system. When this occurs, the engineer will not be able to easily locate the failed device because the entire PROFIBUS network is down. To avoid this situation, ICF-1180I was designed to detect and recognize noise signals. If the bus fails on one side, the noise signal will not propagate through the ICF-1180I and affect additional bus segments. In addition, the ICF-1180I will also trigger an alarm notification to the field engineer on the location of the failure.



Specifications

Technology

Standards:

IEC 61158-2 for PROFIBUS DP

Interface

P1 Port: PROFIBUS DP (DB9 female)

P2 Port: 10/100 Base FX (ST Connector)

Alarm Contact: One relay outputs with current carrying capacity of 1 A @ 24 VDC; Normal open

LED Indicator: PWR1, PWR2, Ready, P1 Status, P2 Status

DIP Switches:

DIP 1~4 for baudrate setting

DIP 5: Fiber link monitor

DIP 6: Single Ring

DIP 7: Fiber Inverse Function

PROFIBUS Communication

Data rate: 9.6, 19.2, 45.45, 93.75, 187.5, 500, 1.5M, 3M, 6M and 12M Kbit/s

Auto Baudrate: Yes

Isolation Protection: 2KV

Optical Fiber Side

Point-to-Point Transmission: Half or Full duplex

Ring Transmission: Half duplex

Physical Characteristics

Housing: Metal

Mounting: Din-rail

Dimensions: 30.3 x 70 x 115 mm (1.19 x 2.76 x 4.53 in)

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements

Input Voltage: 12 to 48 VDC

Connector: Terminal Block

Power Line Protection: Level 3 (2KV) Surge Protection

Over Current Protection: 1.1 A

Standards and Certifications

Safety: UL 60950-1, EN 60950-1

EMC: CE (EN 55022 Class A, EN 55024)(EMI), FCC Part 15 Subpart B Class A(EMS)

Warranty

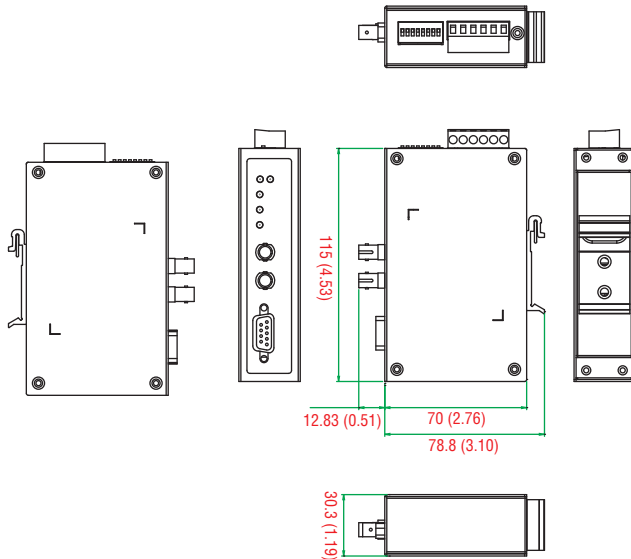
Warranty Period: 5 years

Details: See www.moxa.com/warranty

	100BaseFX	
	Multi-Mode	Single-Mode
Wavelength	820 nm	1310 nm
TX Output	-12 dBm	-8 dBm
RX Sensitivity	-29 dBm	-29 dBm
Link Budget	17 dBm	21 dBm
Typical Distance	4 km	45km

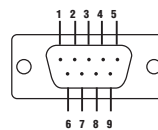
Dimensions and Pin Assignment

Unit: mm (inch)



Pin Assignment

PROFIBUS Connector (DB9 Female)



Pin#	Signal Name
1	N.C.
2	N.C.
3	Profibus D+
4	RTS
5	Signal common
6	5V
7	N.C.
8	Profibus D-
9	N.C.

Ordering Information

Available Models

ICF-1180I-M-ST: PROFIBUS to fiber converter, multi-mode, ST connector, 0 to 60°C

ICF-1180I-S-ST: PROFIBUS to fiber converter, single-mode, ST connector, 0 to 60°C

ICF-1180I-M-ST-T: PROFIBUS to fiber converter, multi-mode, ST connector, -40 to 75°C

ICF-1180I-S-ST-T: PROFIBUS to fiber converter, single-mode, ST connector, -40 to 75°C

Package Checklist

- ICF-1180I series PROFIBUS to fiber converter
- Quick installation guide (printed)
- Warranty card